



Dart Aerospace Ltd.
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2

D212-664-201TRN
Job Sheet 183776



Part No: D212-664-201TRN

Job Qty: 1 ea

Part Name: Crosstube Turning Detail



Part Weight: 0 lbs

Status: Scheduled

Priority: Medium

Job Created: 9/26/18

Job Tracking No:

Due Date: 10/12/18

Created By: Marie Lajeunesse

Type: Stock

Description:

Note: D212-664-241 REV E IPP Rev:A 08-03-06 new issue DD verified by:ec IPP Rev B 08.04.02 Removed polish
EC verified DD

Ship Via:

Bill of Materials

Job Routing

Op No	Operation	Qty	Start Date	Due Date	Standard		Workcenter/Supplier		Sign-off
					Setup hrs	Run Hrs	Workcenter / Supplier	Lead Time	
90	Start up Operation	1 Ea	10/12/18	10/12/18	0.00	0.00	Start Up Crosstubes-2		MD
100	Mori Seiki	1 pcs	10/12/18	10/12/18	0.00	1.33	Mori Seiki TL-40		MD
110	QC	1 pcs	10/12/18	10/12/18	0.00	0.00	QC2 Machining-5		MD
120	Mori Seiki	1 pcs	10/12/18	10/12/18	0.00	1.33	Mori Seiki TL-40		MD
130	QC	1 pcs	10/12/18	10/12/18	0.00	0.00	QC2 Machining-5		MD
140	QC	1 pcs	10/12/18	10/12/18	0.00	0.00	QC8		GP 2018-10-24
145	Crosstubes	1 pcs	10/12/18	10/12/18	0.00	0.25	Crosstubes-2		GP 2018-10-24
150	HandFXtube	1 pcs	10/12/18	10/12/18	0.00	0.25	Crosstubes-3		18/10/24
160	QC	1 pcs	10/12/18	10/12/18	0.00	0.00	QC7-1		GP 2018-10-25
170	Packaging	1 pcs	10/12/18	10/12/18	0.00	0.00	Packaging3-1		GP 2018-10-25
180	QC21-SA	1 Ea	10/12/18	10/12/18	0.00	0.00	QC21		21 OCT 25 2018

Part Op 100 - 1-Fill tube with sand & install plugs DT8534 on both ends as per Folio FA114 2-Turn first side as per Folio FA114
Descriptions: 120 - 1-Turn second side as per Folio FA114
145 - GRIND ONLY TRANSITION LINES SMOOTH LONGITUDE WAY.
150 - 1- handfinish X-TUBE INSIDE AND OUT
170 - Identify and stock in kanban rack Location: CG14

Job BOM

Part / Item	Component Name	Quantity	Operation	Container
D6006-129	Crosstube Material	1 Ea (1 ea)	90-Start up Operation	

8123969

Job Allocations

Operation	Component Part	Required	Inventory	Allocated
90-Start up Operation	D6006-129	1	65	0

Part Specifications

Specifications could not be found.

DQA: _____ Date: _____

WORK ORDER NON-CONFORMANCE / UPDATE



QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____	DISPOSITION Rework Scrap Use-as-is Suspected Unapproved
Part No. _____	
NCR No. _____	

Date : _____	Step #: _____
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Description Work Order Deviation

DART
AEROSPACE

1270 Aberdeen Street
Newkensbury, ON K6A 1K7
CANADA
TEL: 1 813 632-5200
Email: sales@dartaero.com
www.dartaerospace.com

Container No: S118819

Part: D212-664-201TRN

Job No: 183776

Serial No/Batch: S118819

Revision: E

Inspector: _____

Exp Date: _____

Instructions: _____

Date: 10/16/18

Root Cause				FAULT CATEGORY							
Environment	☐	☐	No Re-verification	☐	Pressure/Forced	☐	Temperature/Cure	☐	Power Loss/Surge	☐	Positioned Wrong
Design	☐	☐	Operator	☐	Bending	☐	Set-up	☐	Folio/Program	☐	Outside Dimensions
Doc/Data	☐	☐	Offset/Setup	☐	Centre Not Concentric	☐	BOM/Route	☐	Grain	☐	Over/Under tolerance
Equip/Tooling	☐	☐	Supplier	☐	Cracks	☐	Broken/Damage/Defect	☐	Weld	☐	Part Incorrect
Handling/Pre	☐	☐	Training	☐	Crimp/Kink/Ripple/Wave	☐	Inspection Incomplete/Unqualified	☐	Wrong Stock Pulled	☐	Part Lost/Missing
Material	☐	☐	Use for Testing	☐	Cuffs	☐	Contamination	☐	Out of Sequence	☐	Part Moved
Internal Transport	☐	☐	Poor Information	☐	Crushing	☐	Countersink	☐	Off-set	☐	Drawing
Tribal Knowledge	☐	☐	Rushing	☐	Heat Treat	☐	Cut Too Short	☐	Mislabeled	☐	Finish
LOA	☐	☐	Product Improvement	☐	Wave/Twist in Tube	☐	Instructions Incomplete/Unclear	☐	Fit/Function	☐	Misread
Substation	☐	☐	Process Improvement	☐	Marks/Chatter	☐	Drill Holes	☐	Misaligned/off center	☐	Turning Sequence
Past Expiry Date	☐	☐	Manufacturing Process	OTHER : _____							
Misidentified	☐	☐	Past Due								

2

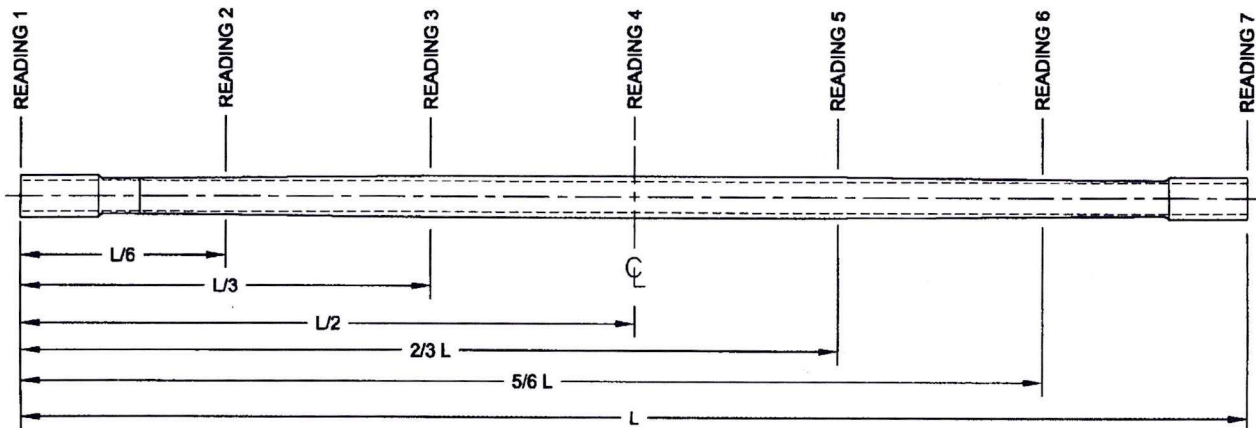
DART AEROSPACE LTD	Work Order: 183776
Description: Crosstube Assembly (205/212 High Aft)	Part Number: D212-664-241
Inspection Dwg: D212-664-241 Rev: E	Page 1 of 2

FIRST ARTICLE INSPECTION CHECKLIST

Inspection Sheet Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	0.200	+/-0.010	.200	✓	CNC-08	
	R0.063	+/-0.010	.063	✓	RG	
	2.990	+0.005/-0.000	2.995	✓	CNC-04	
	5.237	+/-0.030	5.235	✓	CNC-08	
	2.600	+0.005/-0.000	2.604	✓	CNC-04	
	2.686	+0.005/-0.000	2.690	✓		
	2.770	+0.005/-0.000	2.775	✓		
	2.854	+0.005/-0.000	2.859	✓		
	2.938	+0.005/-0.000	2.943	✓		
	3.021	+0.005/-0.000	3.025	✓	CNC-05	
	3.133	+0.005/-0.000	3.138	✓	"	
	3.179	+0.005/-0.000	3.181	✓	"	
SIDE B	0.200	+/-0.010	.201	✓	CNC-08	
	R0.063	+/-0.010	.063	✓	RG	
	2.990	+0.005/-0.000	2.995	✓	CNC-04	
	5.237	+/-0.030	5.235	✓	CNC-08	
	2.600	+0.005/-0.000	2.604	✓	CNC-04	
	2.686	+0.005/-0.000	2.690	✓		
	2.770	+0.005/-0.000	2.775	✓		
	2.854	+0.005/-0.000	2.859	✓		
	2.938	+0.005/-0.000	2.943	✓		
	3.021	+0.005/-0.000	3.025	✓	CNC-05	
	3.133	+0.005/-0.000	3.138	✓	"	
	3.179	+0.005/-0.000	3.184	✓	"	
	124.362	+/-0.020	124.362	✓	Tape	

DART AEROSPACE LTD	Work Order: 183776
Description: Crosstube Assembly (205/212 High Aft)	Part Number: D212-664-241
Inspection Dwg: D212-664-241 Rev: E	Page 2 of 2

WALL THICKNESS MEASUREMENT



Location	WALL THICKNESS MEASUREMENT (IN)				Deviation Δw (max-min)	TOLERANCE
	w1	w2	w3	w4		
READING 1 L= 0"	.402	.399	.390	.395	.012	0.062"
READING 2 L= 20.73	.327	.325	.308	.313	.019	
READING 3 L= 41.45	.493	.501	.496	.488	.013	
READING 4 L= 62.18	.518	.519	.533	.527	.015	
READING 5 L= 82.91	.479	.496	.507	.494	.028	
READING 6 L= 103.64	.314	.332	.326	.306	.026	
READING 7 L= 124.36	.409	.409	.385	.388	.024	

Calibration Result

Actual Block Thickness: 200-500

Sitiescan 250 Measured Thickness: 200-500

Measured by: MD	Audited by: GP	Preliminary Approval:
Date: 2018-10-16	Date: 2018-10-24	Date:

Rev	Date	Change	Revised by	Approved
A	05.04.27	New Issue (P/O D412-664-201)	KJ/JLM	
B	06.03.09	Tolerance for 5.237 was +/-0.001	KJ/JLM	
C	07.05.08	Dwg Rev. updated	KJ/JLM	
D	10.08.03	Dimension 124.362 was 124.36	KJ	
E	12.06.04	Wall thickness form added	KJ	
F	15.03.03	Dwg Rev updated	KJ	

Item	Qty -241	Qty -241B	Part Number	Description
1	X		D212-664-241	CROSSTUBE ASSEMBLY (205/212 HIGH AFT)
2		X	D212-664-241B	CROSSTUBE ASSEMBLY (214 HIGH AFT)
3	1	1	D6006-129	CROSSTUBE
4	2		D2940-1	SUPPORT
5	4	4	D3595-063-530	RUBBER CUSHION
6		2	D5018-1	SUPPORT
7	4	4	MS21920-28	CLAMP (OR MS21920-30)
8	A/R	A/R	PROSEAL 890 B-2	SEALANT, AMS-S-8802 CLASS B-2

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6006-129
FINISHED LENGTH = 124.362±0.020
- 2) FINISH: a) CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
b) PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
c) MASK UNDERSIDE OF CROSSTUBE AS SHOWN (ZN C6-2 / C6-3, HATCHED AREA)
d) PAINT OUTSIDE PER DART QSI 005 4.2
e) REMOVE MASKING AND APPLY MATTE CLEAR COAT
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D212-664-XXX" AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS.
- 7) WEIGHT: D212-664-241/-241B = 44.2 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.

MACHINING

- 10) RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.

BENDING

- 11) BEND PROGRESSIVELY WITH A MINIMUM OF 5 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 7.2% (BASED ON O.D.) IN LOWER HALF OF R35.5 BEND AND 6% (BASED ON O.D.) ON REMAINING TUBE.
- 12) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.

ASSEMBLY

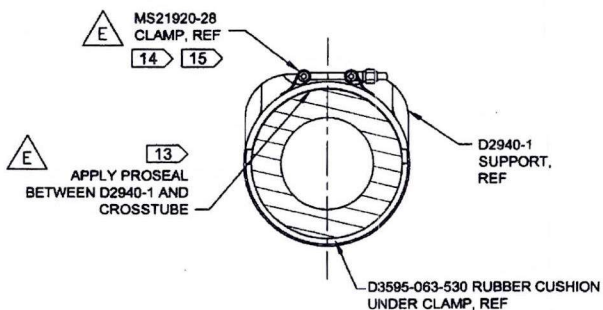
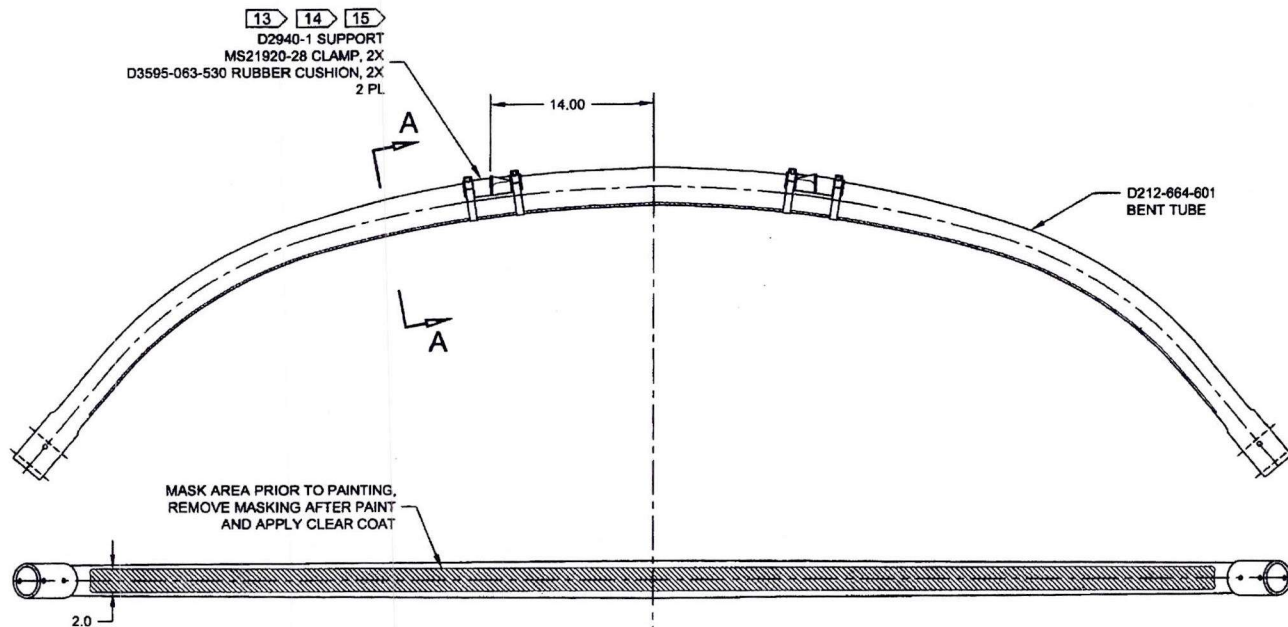
- 13) INSTALL D2940-1 / D5018-1 SUPPORT: ABRASE MATING SURFACE OF SUPPORT AND CROSSTUBE WITH 180-GRIT SANDPAPER AND REMOVE RESIDUE WITH MEK (OR EQUIVALENT). APPLY A 0.04" TO 0.07" THICK LAYER OF PROSEAL 890 CLASS B-2 (OR AMS-S-8802 CLASS B-2) SEALANT TO MATING SURFACE OF SUPPORT.
- 14) INSTALL MS21920-28 CLAMPS (OR -30) WITH D3595-063-530 RUBBER CUSHIONS TO SECURE THE SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE ON TOP SIDE OF CROSSTUBE.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER PROSEAL 890 SEALANT HAS CURED FOR 72 HOURS.

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WITHOUT NOTICE
WORK ORDER
NO. 183776 *ML*
180926

RELEASED
2014-05-26

E	D5018-1 WAS D2940-1 (-241B), PROSEAL WAS MAGNOBOND, NOTE 2: ADD INSPECTION WINDOW, NOTE 11: ALLOW 7.2% CRUSH, NOTE 15: ADD 72HR CURE AND RETORQUE FOR PROSEAL, ADD SHEET 3, CLAMPS REVERSED TO PREVENT CHAFING (ZN B7-2, B7-3), BEND HEIGHT TOL. NOW 0.25 WAS 0.13 (C1-4), INCORP DEO D-1-2	CP	14.04.01
D	REFORMAT/REVISE GENERAL NOTES/PART LIST; REORGANIZED VIEWS AND REFORMATTED DRAWING TO CURRENT STANDARDS; ADD -241B (ZN D4-2, B4-2); REMOVED REF & ADD TOLERANCES (ZN D8-3 & C4-3, C6-3 & A8-3); RELOCATED FLAG #6 PER PAR 08-046 (ZN A5-3); MOVED TURNING DETAIL & UPDATED TOLERANCE TO SHEET 4	RF	09.09.30
C	REMOVE -1009 ABRASION STRIP; ADD MAGNOBOND 6398, CUSHION, REVERSE CLAMPS	PH	07.03.08
B	ADD HOLES FOR COMPATABILITY WITH BHT/AA SKIDTUBES	PH	05.02.04
A	NEW ISSUE	CP	00.12.12
REV.	DESCRIPTION	BY	DATE
DESIGN			
DRAWN			
CHECKED			
MFG. APPR.			
APPROVED			
DE APPR.			
DATE	14.04.01		

DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWING NO. D212-664-241	REV. E SHEET 1 OF 5
TITLE CROSSTUBE ASS'Y (205/212 HI AFT)	SCALE NTS
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SECTION A-A
SCALE 4X

D212-664-241
ASSEMBLY DETAIL

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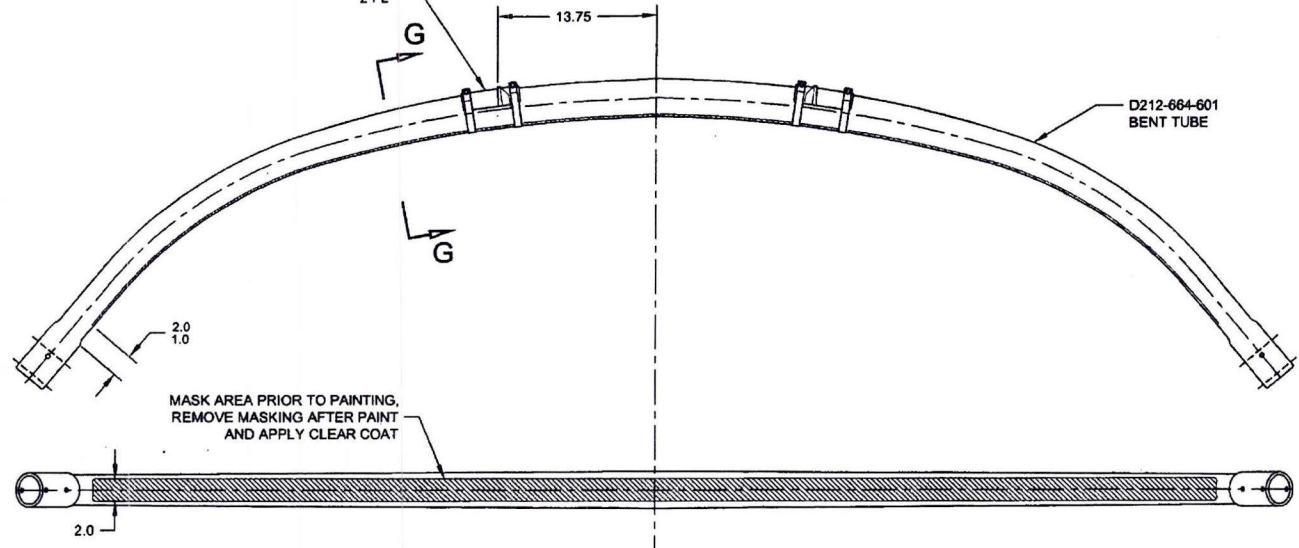
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DRAWN	JP	HAWKESBURY, ONTARIO, CANADA	
CHECKED	SLW	DRAWING NO.	REV. E
MFG. APPR.	JP	D212-664-241	SHEET 2 OF 5
APPROVED	JP	TITLE	SCALE
DE APPR.	JP	CROSSTUBE ASS'Y (205/212 HI AFT)	NTS
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8 7 6 5 4 3 2 1

D
C
B
A

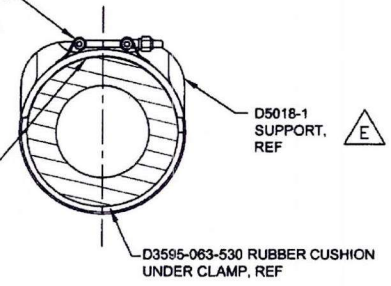
D
C
B
A

E **13** **14** **15**
 D5018-1 SUPPORT
 MS21920-28 CLAMP, 2X
 D3595-063-530 RUBBER CUSHION, 2X
 2 PL



E MS21920-28
 CLAMP, REF
14 **15**

E **13**
 APPLY PROSEAL
 BETWEEN D5018-1 AND
 CROSSTUBE



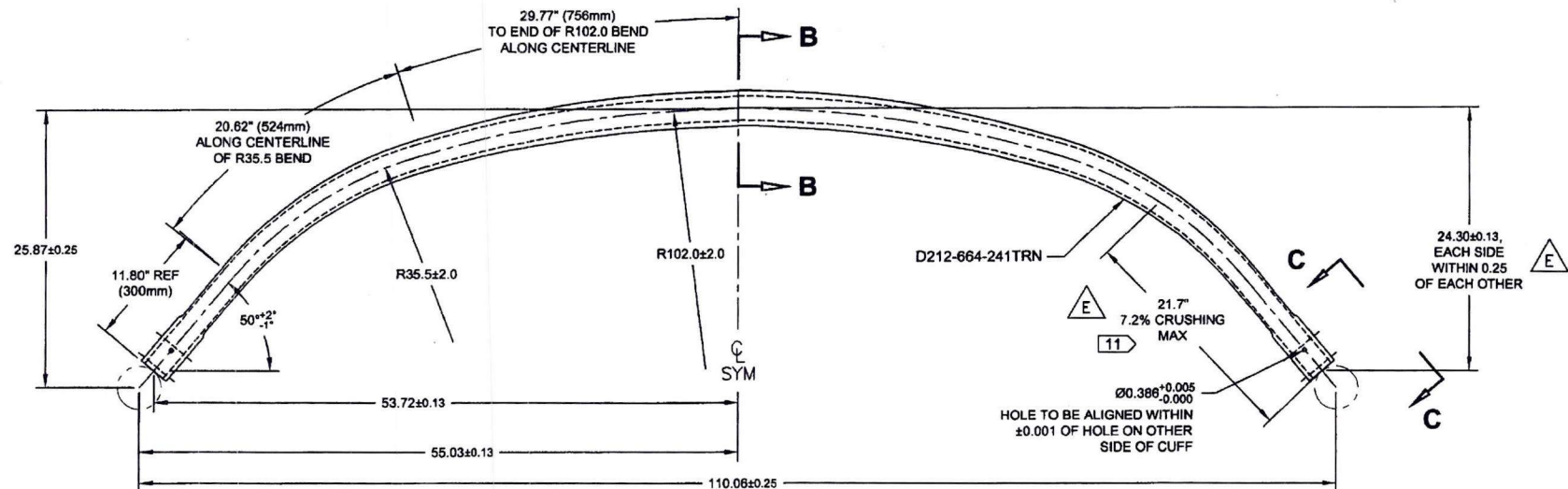
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 SCALE 4X

D212-664-241B
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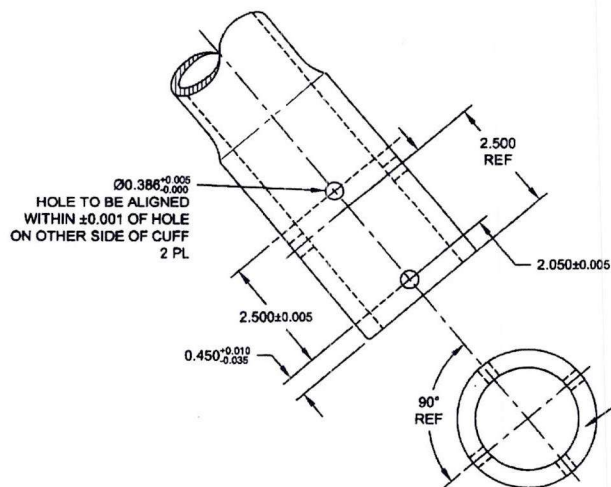
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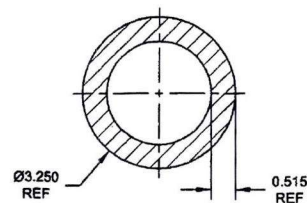
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D212-664-601 11
BENDING AND DRILLING DETAIL



VIEW C-C: CUFF DETAIL
 SCALE 3X



SECTION B-B
 SCALE 4X

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WHD

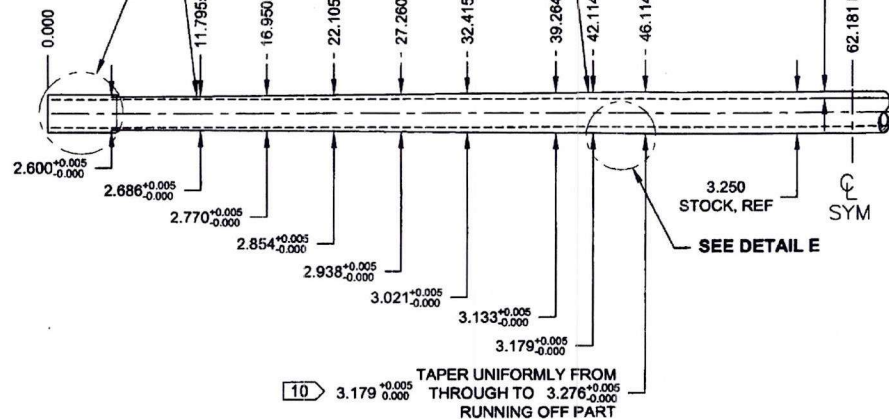
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R100.0 TRANSITION
BETWEEN TAPERED
SECTIONS

R100.0 TRANSITION
BETWEEN TAPERED
SECTIONS

0.515 WALL
STOCK, REF

SEE DETAIL D



SEE DETAIL E

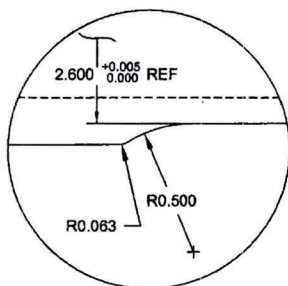
10

30° X 0.500 DEEP
CHAMFER

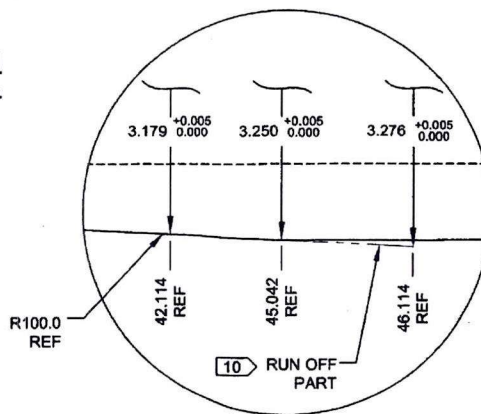
SEE DETAIL F

DETAIL D:
CROSSTUBE CUFF
SCALE 5X

D212-664-241TRN
TURNING DETAIL



DETAIL F:
CUFF TRANSITION
SCALE 10X



DETAIL E:
TAPER RUN-OFF
NOT TO SCALE

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2014-05-26

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